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SCIENCE :

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JOHN MICHELS, Editor.

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WE have for several years entertained a favorable opinion regarding the advisability of establishing a well equipped observatory for the almost exclusive purpose of astronomical discovery. One has only to recount the labors of American astronomers during a brief term of years to remark the great advancement of their science, which has resulted from the direction of energy toward this end. Professor BOND's discovery of a new satellite and a dusky ring to the planet Saturn; Mr. BURNHAM's well-known discoveries of new double stars; the discovery of the companion of the bright star Sirius by Mr. ALVAN G. CLARK; the discovery of fifty or sixty small planets between Mars and Jupiter by Dr. PETERS and Professor WATSON; the independent discovery of three or four comets by Professor SWIFT; the discoveries of intra-Mercurial planets, at the time of the eclipse of 1878, by Professors WATSON and SWIFT; the extraordinary discovery of the two satellites of Mars by Professor HALL; the brilliant spectroscopic discoveries by Dr. HENRY DRAPER of the existence of oxygen in the sun, and of the inherent heat of the planet Jupiter—are recalled at once. We might add greatly to the list without difficulty; but that is not necessary for the support of the belief that astronomers have not discovered all there is to discover in the solar system even, although their labors have been very arduous, and their means of research most powerful. We should be inclined to predict a scientific record of great importance and usefulness for any observatory of high instrumental capacity, which should set out upon a line of systematic observation, with reference to astronomical discovery simply. It is gratifying, therefore, to learn that the new observatory, now in process of erection at Rochester, N. Y., would seem to be dedicated to this sort of work. Professor LEWIS SWIFT, of that place, has, we believe, been installed the life director of that institution, constructing

and endowed by the munificence of Mr. H. H. WARNER, an enterprising merchant of Rochester, and entitled, from its founder, the Warner Observatory. About \$50,000 will be expended in the construction of the observatory proper, and the connected structure. The Messrs. CLARK, of Cambridgeport, are now making a large refracting telescope (aperture of the object-glass, sixteen inches) for this new observatory. We regret that, in the proposed construction of this edifice, the architect should, in some measure, have resorted to the former system of building observatories—that of mounting the great telescope upon a pier of masonry built high up from the surface of the ground. A series of properly conducted experiments will usually indicate, however, whether this method is free from objection in any particular case. We note a connected contrivance—hitherto unknown in astronomy—a passenger-elevator to the floor of the dome. We shall express the hope that the abundance of new devices with which this new observatory is to be supplied may not be marked, as is frequently the case, by a less amount of good astronomical work than is performed in observatories of like capacity, where nothing is for convenience and everything for pure utility.

A lecture on "Microphysiology" was recently delivered before the Polytechnic Association of New York, by a person having an unenviable reputation for making extravagant assertions on scientific questions. It has been widely reported by the public press, and we notice that a claim is made that the origin of Bacteria and minute forms of life in the atmosphere has been discovered by the lecturer.

It was also asserted at the same time that microscopical organisms can be developed in the laboratory under conditions which exclude atmospheric contact, a fact in direct contradiction to the exhaustive experiments of Tyndall and others.

The problems thus professed to be solved have defied the intelligent research of such men as Huxley, Dallinger, Beale, Sanderman and Bastian, aided by the most powerful and perfect objectives obtainable. The present assertions to the contrary will, therefore, be received with humor by those acquainted with the subject, if the mischief caused by such reckless statements be not considered.

The announcement made at the same time of the discovery, by the lecturer, of a new form of objective, the extended application of which nearly doubles the present limit of the magnifying power of microscopical objectives, requires but a passing notice.

This individual appears to have fallen into the error of supposing that the excellence of a microscope is

to be determined by the greatness of its magnifying power. On the contrary that instrument must be considered the most efficient which renders the details of an object perceptible with the lowest power. Distinctness of definition, by which is meant the power of rendering all the minute lineaments clearly seen, is a quality of greater importance than mere magnifying power. Indeed, without this quality mere magnifying power ceases to have any value.

At present there is an honorable competition between Spencer and Tolles, of America, Powell and Lealend, of England, and Zeiss, of Germany, as to who shall produce the most perfect microscopical objectives; and it would be a difficult matter to decide which of these firms possesses the greatest merit in workmanship. Zeiss, with his oil immersion system, may have obtained the credit of a temporary advantage, but similar forms of objectives are now being manufactured in this and other countries with success.

These makers are bringing to bear on their work all the most recent discoveries in optical science, and if any advance is made in the magnifying power of objectives, we shall expect to find it produced by such skilled opticians.

PALÆONTOLOGICAL RESEARCHES.

BY PROF. HENRY S. WILLIAMS, Ph. D., Cornell University.

I.

Genesee Slate. Fauna and Flora of Station xxxiv. d., H. S. W.

On the eastern shore of Cayuga Lake, N. Y., near the head, is a fine exposure of the boundary strata of the Hamilton and Chemung periods. Careful examination has been made of the upper part of the Genesee slate as it occurs in Burdich's Ravine, the face of the high fall. (Station xxxiv. H. S. W.) Here the lowest Portage sandstone lies about 60 feet above the surface of the lake, and the characteristic Genesee slate follows immediately under it. The following species were obtained in the slate between four and five feet below the sandstone stratum, forming the base of the Portage group:

Discina lodensis, Van.—abundant.

Discina truncata, Hall—frequent.

Lingula spatulata, Van.

Lingula concentrica—(of Vanuxem's Rep't, but not Conrad's species). See beyond.

Tentaculites fissurella H.—abundant. (See beyond).

Leiorhynchus quadricostatus, Van.

Chonetes lepida, Hall.

Aviculopecten fragilis, Hall.

Orthoceras—(subulatum?).

Ambocælia umbonata, Con.

Avicula speciosa, Hall.

Impression of part of *Goniatites*?

Plants, three well marked forms.

This fauna has several interesting forms in it.

The recurrence of *Marcellus* forms noticed by Hall, in Geol. 4th Dist. N. Y., p. 222, 1843, is seen to be more marked than was observed by him.

The *Tentaculites fissurella*, Hall, may prove to be *Styliola* (2 p.) but if so, the same form is repeated in the Genesee slate from the *Marcellus* shale.

It is difficult to be satisfied with the recognition of this form in *Styliola*, since annulated forms occur together with the smooth ones, and except in the annulations are not to be separated from the true *Styliola* forms. The shells are very frail and crushing may account for the longitudinal folds in part, as it does in some of the *Orthoceratidæ*.

This fact is noticed by Hall in the *Marcellus* forms (in Illustrations Der Fossils, Pl. xxvi.) and the "prevailing form," fig. 14, is the prevailing form in the Genesee, and among the specimens just collected the annulated forms do not differ in size from the smooth ones, and the latter are often larger.

Discina lodensis, Van. occurs in abundance, and with some variation, but the form called *D. truncata*, H. is distinct and does not show gradation into the former. Still this is also distinct from the *Lingula* which Vanuxem figured, but did not describe in Geol. of 3d Dist., N. Y., p. 168, fig. 4. Vanuxem refers the species to Conrad's *Lingula concentrica*, which is evidently a mistake since Conrad's species, *L. concentrica*, is from the Helderberg mountain, in limestone, and is $\frac{3}{4}$ inch long (see Geol. Rep't, N. Y., 1839, p. 64). The species found in association with *L. spatulata* is nearly 5 millimetres long and 3.3^{mm} broad, and the cardinal margin is broadly, evenly rounded, and not attenuated as in *spatulata*.

L. spatulata, Van. is nearer the size figured by both Hall and Vanuxem (from 4 to 4.5^{mm}) instead of approaching 7.5^{mm} ($\frac{3}{10}$ inch) as stated by Hall in the description (Pal. of N. Y., vol. 4, p. 13). These are of the ordinary size of *Lingula spatulata*, Van. as they have been observed by the author. The *Lingula concentrica* (of Van. not Con.), is distinguished from the *Discina truncata* by the absence of the indentation or truncation, and the extension of the margin beyond the umbo, as well as other characters not as easily observed.

The *Chonetes* found is distinctly the *Chonetes lepida* of Hall, and not *setigera*. Still this may prove a variety of *setigera* upon further study; the two occur together in the Moscow shales and *Marcellus*, and in other strata of the Hamilton.

Only a single specimen of *Aviculopecten fragilis* was found, but this distinct and characteristic.